

REMARKS

Summary

1. Claims 1 through 10 were originally presented in this application. Claims 11-17 were added in Applicants' amendment of November 23, 2005, and claims 18 and 19 were added in Applicants' amendment of July 24, 2006. No claims have been added, canceled, or amended in this paper, and thus claims 1 through 19 remain pending before the examiner.
2. Applicants believe it may be helpful to provide a brief summary of the structure and associated advantages of the instant invention prior to addressing the particulars of the outstanding rejections. An important feature of the present invention is that a *bulk* composite of a ceramic and a metal is disposed atop the ceramic susceptor (cf. independent claims 1 and 11). The ceramic-metal composites of the present invention may be characterized as having (i) a high thermal conductivity, (ii) a Young's modulus greater than that of typical metals, and (iii) a toughness greater than that of typical ceramics. Thus, the above-described structure in which the ceramic-metal composite is deployed atop the ceramic susceptor conveys numerous operational advantages. In particular, the thermally conductive ceramic-metal composite advantageously conducts heat uniformly to the semiconductor wafer or liquid crystal device set onto the wafer holder. Therefore, the present invention advantageously provides for outstanding thermal uniformity across the entire surface of even the largest surface area devices. Additionally, due to the toughness of the composite, the holder is highly unlikely to crack even in situations of extreme localized thermal stress.

Claim Rejections - 35 U.S.C. § 102

3. Claims 1, 11, 15, and 19 stand rejected under 35 U.S.C. § 102(b) as being anticipated by *Wang et al.* (U.S. Pat. No. 6,490,146). In particular, with respect to independent claim 1, the Examiner states,

Wang discloses a holder for use in semiconductor or liquid crystal manufacturing devices, comprising: a ceramic susceptor 190 (Fig. 1; col. 11, lines 1-29); and a composite 175 of a ceramic and a metal furnished atop said ceramic susceptor 190, the composite 175 including a mixture of metallic and ceramic constituents, the mixture including metallic microconstituents distributed in a ceramic matrix. (See also col. 5, line 40 to col. 6, line 38).

4. Applicants respectfully traverse this rejection and submit that the structure of the present invention distinguishes over that disclosed by *Wang et al.* In particular, independent claim 1 recites that the ceramic-metal composite is furnished atop the ceramic susceptor. Independent claim 11 is similar in that it recites a ceramic-metal composite deployed between a processing surface of the claimed holder, and the ceramic susceptor. *Wang et al.*, on the other hand, discloses a ceramic-metal composite 175 having a heating element 255 deployed internally therein. Moreover, the ceramic-metal composite 175 is located below a dielectric layer 115. (Cf. Figs. 1, 2, and 6 of the reference.) As such, *Wang et al.* discloses a ceramic-metal composite deployed within, as opposed to atop, a susceptor. Therefore, *Wang et al.* cannot anticipate the instant invention as recited in independent claims 1 and 11.
5. Applicants further note that the structure of the present invention is important to its functionality. In particular, deploying the ceramic-metal composite atop the ceramic susceptor (including a heating element) enables the highly conductive ceramic-metal composite to uniformly conduct heat to a semiconductor wafer or liquid crystal device set onto the wafer holder. Therefore, the present invention advantageously provides for outstanding thermal uniformity across the entire surface of devices of even the largest surface area. On the contrary, a structure such as that disclosed by *Wang et al.*, in which the heating element is deployed in the composite, does not distribute heat uniformly to the semiconductor wafer or liquid crystal device. Therefore, the thermal uniformity tends to be inadequate on large-area devices. Applicants respectfully submit that the present invention as claimed is patentably distinct from *Wang et al.*
6. Claims 1-19 stand rejected under 35 U.S.C. § 102(b) as being anticipated by *Ohashi et al.* (U.S. Pat. App. Pub. No. 2003/0064225). In particular, with respect to independent claim 1, the Examiner states,

Ohashi discloses a holder for use in semiconductor or liquid crystal manufacturing devices (para. [0026]), comprising: a ceramic susceptor 120 or 127 (Fig. 12); and a composite 125 of a ceramic and a metal furnished atop said ceramic susceptor 120/127, the composite 125 including a mixture of metallic and ceramic constituents, the mixture including metallic microconstituents distributed in a ceramic matrix. (See paras. [0081], [0090], [0109].)
7. Applicants respectfully traverse this rejection and submit that the structure of the present invention distinguishes over that disclosed by *Ohashi et al.* Applicants respectfully submit that the instant invention distinguishes over *Ohashi et al.* for at least three important reasons:

First, the instant invention involves a **bulk** ceramic-metal composite deployed atop a susceptor. (Cf. element 1 in original Figs. 1A and 1B, for example). As explained earlier in these remarks, the ceramic-metal composite functions to uniformly distribute thermal energy from a heating element to a semiconductor wafer or liquid crystal device set onto the composite. *Ohashi et al.* disclose on the contrary a **thin film** of ceramic-metal composite fashioned as an electrode—that is, to perform an electrical function. (Cf. Fig. 12 and Paragraph [0109] therein.)

Second, in contrast to the instant invention, there is no disclosure of a heating element in *Ohashi et al.*

Third, as shown on Fig. 12, *Ohashi et al.* discloses a diamond film 128 deployed atop the ceramic-metal composite 125. Thus the ceramic-metal composite is an internal electrode, as opposed to the case with the instant invention, in which the semiconductor wafer or liquid crystal device to be processed is set directly atop the ceramic-metal composite.

In sum, the structure and function of the ceramic-metal composite, as well as its location in the susceptor, distinguish the present invention over *Ohashi et al.* Accordingly, Applicants respectfully submit that *Ohashi et al.* cannot anticipate the present invention.

8. Claims 1-4, 8-11, and 14-19 stand rejected under 35 U.S.C. § 102(b) as being anticipated by *Inazumachi et al.* (U.S. Pat. No. 6,693,789). In particular, with respect to independent claim 1, the Examiner states,

Inazumachi discloses a holder for use in semiconductor or liquid crystal manufacturing devices (col. 1, lines 15-26), comprising: a ceramic susceptor 3 (Figs. 1-2); and a composite of a ceramic and a metal 2 furnished atop said ceramic susceptor 3, the composite 2 including a mixture of metallic and ceramic constituents, the mixture including metallic microconstituents distributed in a ceramic matrix. (See col. 5, lines 51-63; col. 7, lines 1-28; col. 9, lines 45-63.)

9. Applicants respectfully traverse this rejection and submit that the structure of the present invention distinguishes over that disclosed by *Inazumachi et al.* Applicants respectfully submit that the instant invention distinguishes over *Inazumachi et al.* for at least the same three important reasons described above in Paragraph 7 with respect to *Ohashi et al.*:

First, the instant invention discloses a **bulk** ceramic-metal composite deployed atop a susceptor. (Cf. element 1 in original Figs. 1A and 1B, for example). As discussed above, the ceramic-metal composite functions to uniformly distribute thermal energy from a heating element to a semiconductor wafer or liquid crystal device set onto the composite. *Inazumachi et al.* disclose on the contrary a **thin**

film of ceramic-metal composite 2 fashioned as an electrode—that is, to perform an electrical function. (Cf. Figs. 1 and 2 and column 6 therein.)

Second, in contrast to the instant invention, there is no disclosure of a heating element in *Inazumachi et al.*

Third, *Inazumachi et al.* discloses that the electrode 2 is an **internal** electrode. In particular, Figs. 1 and 2 show a structure in which the electrode 2 is sandwiched between two ceramic plates 1 and 3 and is therefore deployed **within** the susceptor. Thus, as described above, the ceramic-metal composite is an internal electrode 2, as opposed to the case with instant invention, in which the semiconductor wafer or liquid crystal device to be processed is set directly atop the ceramic-metal composite.

In sum, the structure and function of the ceramic-metal composite, as well as its location in the susceptor, distinguish the present invention over *Inazumachi et al.* Accordingly, Applicants respectfully submit that *Inazumachi et al.* cannot anticipate the present invention.

10. For the reasons set forth above in Sections 4, 5, 7, and 9, Applicants respectfully submit that independent claims 1 and 11 are patentable over the prior art of record. Independent claims 1 and 11 being allowable, it follows that dependent claims 2 through 10 and 11 through 19 must also be allowable, since these dependent claims carry with them all the elements of the independent claims from which they depend.

Accordingly, Applicants courteously urge that this application is in condition for allowance. Reconsideration and withdrawal of the rejections is requested. Favorable action by the Examiner at an early date is solicited.

Respectfully submitted,

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